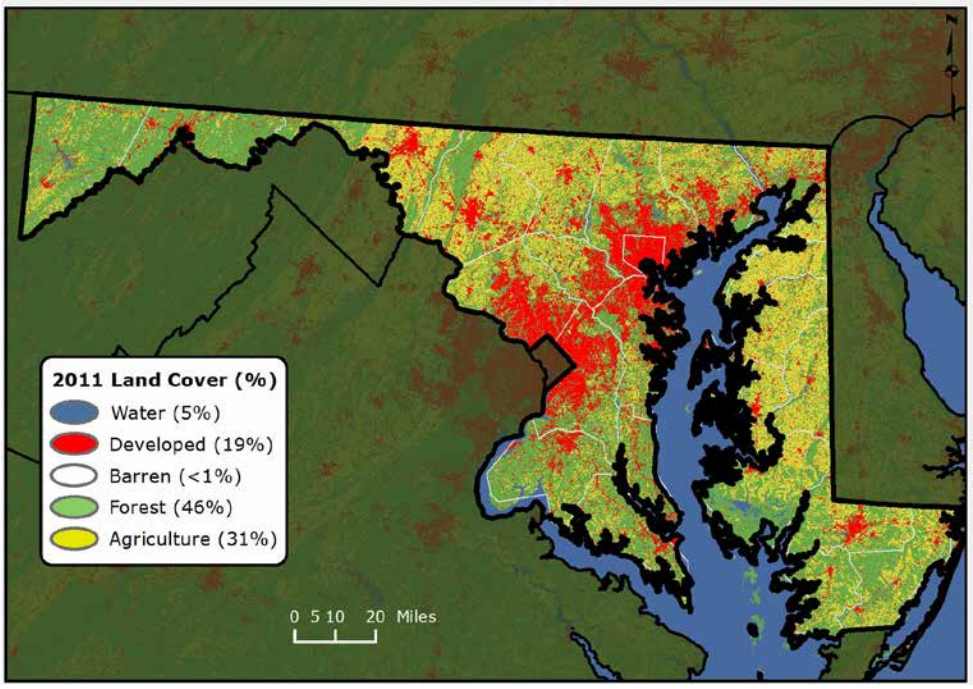
USDA
United States Department of Agriculture

2017 Forest Health highlights

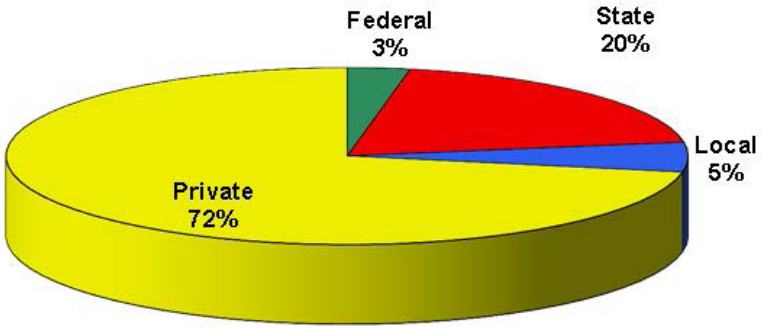
MARYLAND

Forest Resource Summary

Maryland occupies a land area of 6,264,876 acres. Forest land comprises 2,709,062 acres, of which nearly 76 percent is privately owned. Healthy, productive forests are critical in urban and rural areas for soil conservation, clean air and water, wildlife habitat, outdoor recreation, and aesthetics. The forest products industry is the largest employer in Allegany and Garrett Counties and the second largest employer on the Eastern Shore.



Forest Land Ownership in Maryland, 2012

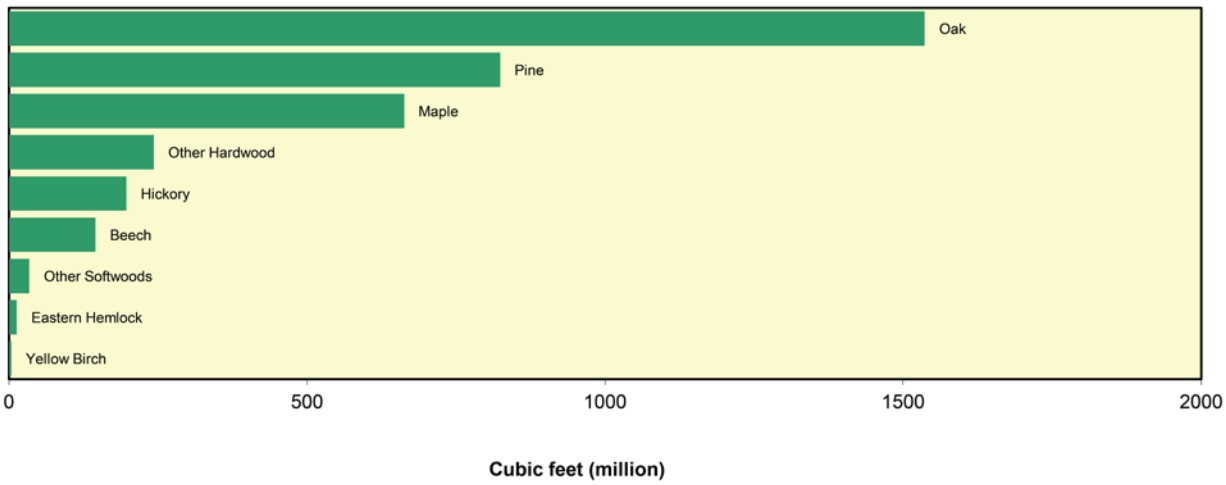


Forest Service
Northeastern Area
State and Private Forestry

Maryland Department of Agriculture

May 2018

Net Volume of Growing Stock on Timberland by Species in Maryland, 2012



Forest Health Surveys

In 2017, gypsy moths defoliated 5 acres, variable oakleaf caterpillars defoliated 5,700 acres, and ash rust defoliated 2,500 acres.

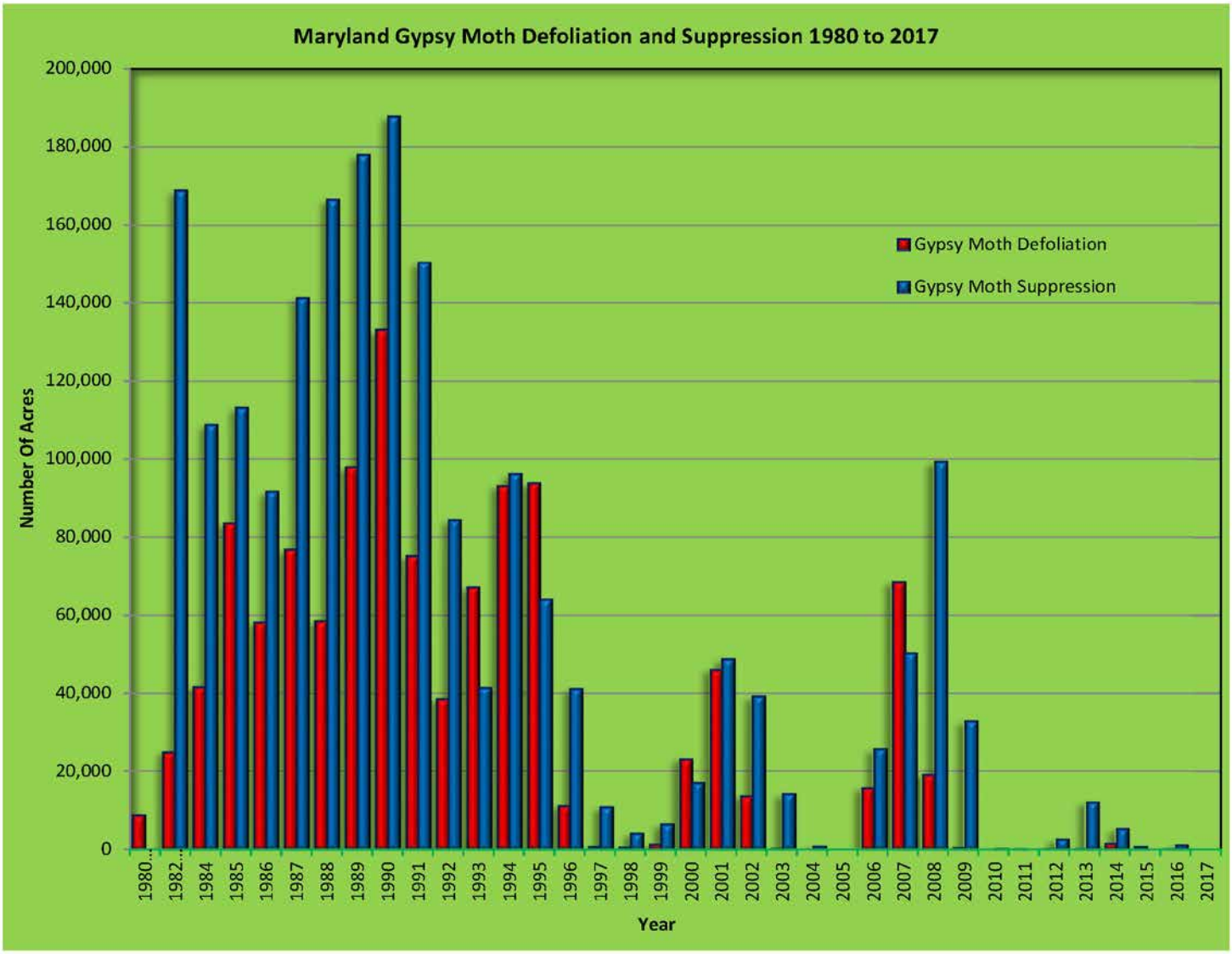
Mature chestnut and red oaks are dying in Maryland's most northern tier counties and one county on the Eastern shore. Secondary pests are present, but are likely not the cause of mortality. Trees have been tested by a U.S. Forest Service pathologist, and the results were first found to be inconclusive. A second test was run, and trees in Carroll County tested positive for oak wilt. A database of oak mortality is being developed to determine if environmental factors are contributing to decline.

Forest Pest Issues

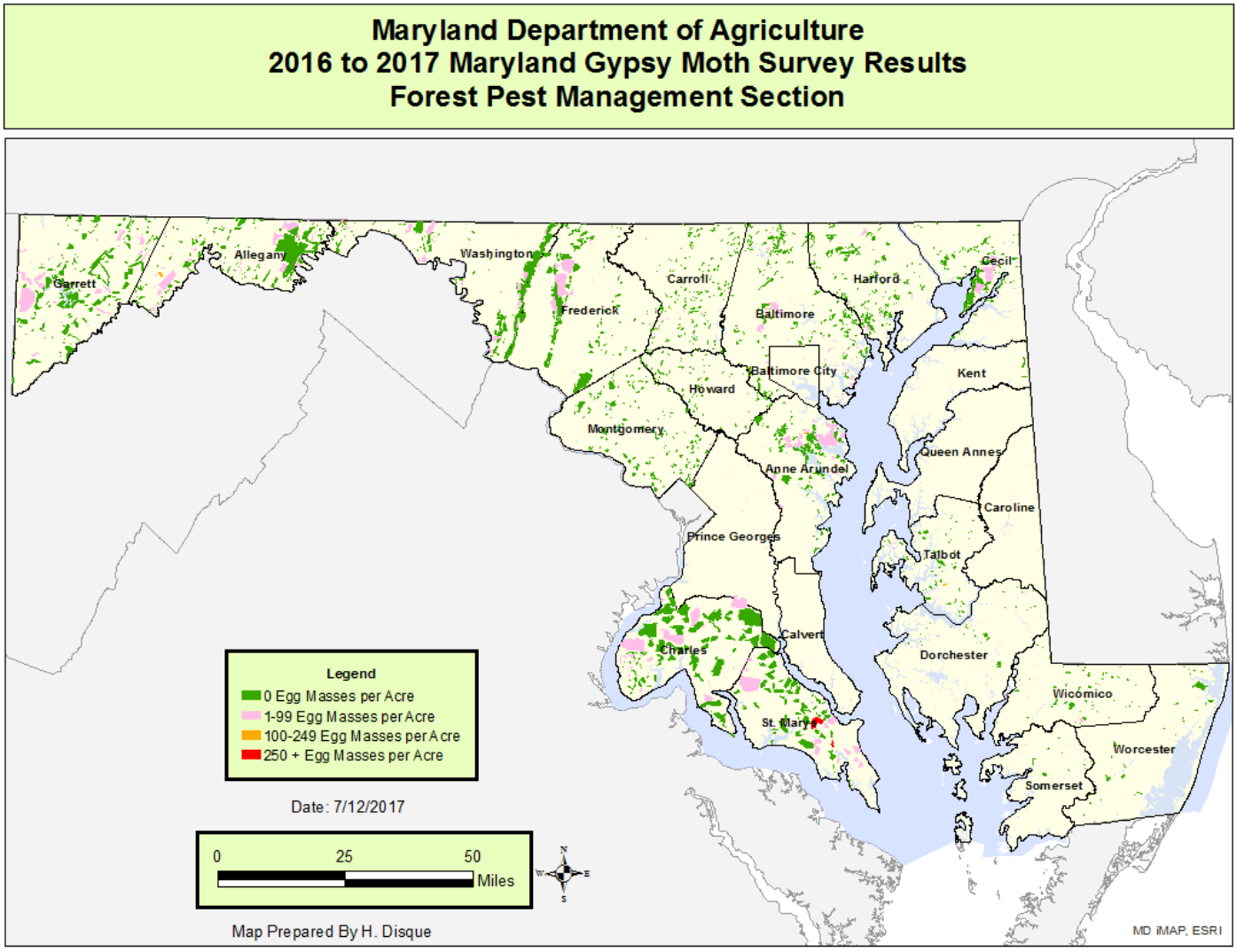
Gypsy Moth

The gypsy moth is the most serious threat to oak forests in the United States. The first eggs were detected in Maryland in 1971, and the first extensive defoliation occurred in 1981. Each fall and winter, the Maryland Department of Agriculture (MDA) conducts an extensive survey for gypsy moth egg masses to determine potential areas of defoliation. From August 2016 through March 2017, MDA personnel conducted gypsy moth egg mass surveys on 481,162 acres of "high-value" forested lands. High-value forested sites include areas with development, recreational use, managed forest and wildlife resources, and other site conditions that render dieback and mortality economically and socially important.

The survey results indicated that the current populations were insufficient to cause moderate to heavy defoliation. St. Mary's, Garrett, and Washington Counties recorded several blocks with high populations of gypsy moth. Gypsy moths defoliated fewer than 100 acres this year in southern Maryland and on the Eastern Shore. Gypsy moth egg mass surveys for the 2017–18 season are ongoing and are approximately 80% complete as of the writing of this report. Counts are trending low statewide with only two small areas of concern in Washington County.



Maryland gypsy moth defoliation and suppression from 1980 to 2017.



MDA Forest Pest Management Section gypsy moth survey results for 2016 to 2017.

Maryland Department of Agriculture
2016 - 2017 Maryland Gypsy Moth Egg Mass Survey Summary
Forest Pest Management

County - Eastern Shore	Total	Private & County	State	# Positive	% Positive	# Blocks	# Acres	% Positive 2015-2016
Caroline	42	0	42	0	0.0	6	3,848	7.5
Dorchester	118	80	38	7	5.9	39	2,826	17.4
Queen Anne's	18	0	18	0	0.0	7	402	0
Somerset	52	52	0	7	13.5	18	1,297	42.6
Talbot	195	191	4	7	3.6	77	6,445	8.4
Wilcomico	219	213	6	19	8.7	69	6,121	21
Worcester	148	110	38	13	8.8	43	4,950	19.2
TOTALS	**792**	**646**	**146**	**53**	**6.7**	**259**	**25,889**	**17.2**
County - SOUTHERN	**Total**	**Private & County**	**State**	**# Positive**	**% Positive**	**# Blocks**	**# Acres**	**% Positive 2015-2016**
Charles	228	198	30	30	13.2	58	82,075	5.3
St. Marys	238	228	10	21	8.8	61	43,475	12.3
Anne Arundel	356	353	3	32	9.0	67	26,461	18.7
Prince Georges	0	0	0	0	0.0	0	0	0
Calvert	0	0	0	0	0.0	0	0	0
TOTALS	**822**	**779**	**43**	**83**	**10.1**	**186**	**152,011**	**13.6**
County - NORTHEAST	**Total**	**Private & County**	**State**	**# Positive**	**% Positive**	**# Blocks**	**# Acres**	**% Positive 2015-2016**
Baltimore	852	767	85	49	5.8	189	28,746	6.4
Cecil	448	363	85	15	3.3	76	22,390	3.2
Harford	512	485	27	6	1.2	126	20,219	2.8
Kent	10	0	10	0	0.0	3	734	0
Baltimore City	0	0	0	0	0.0	0	0	0
TOTALS	**1,822**	**1,615**	**207**	**70**	**3.8**	**394**	**72,089**	**4.6**
County - WESTERN	**Total**	**Private & County**	**State**	**# Positive**	**% Positive**	**# Blocks**	**# Acres**	**% Positive 2015-2016**
Allegany	839	405	434	54	6.4	159	47,194	11.4
Garrett	1,064	600	464	59	5.5	183	61,295	6
Washington West	333	205	128	26	7.8	52	10,953	12.7
TOTALS	**2,236**	**1,210**	**1,026**	**139**	**6.2**	**394**	**119,442**	**9**
County - CENTRAL	**Total**	**Private & County**	**State**	**# Positive**	**% Positive**	**# Blocks**	**# Acres**	**% Positive 2015-2016**
Carroll	541	419	32	4	0.7	181	13,819	2.8
Frederick	740	607	133	35	4.7	171	47,998	10.1
Howard	195	159	36	0	0.0	68	6,544	0.3
Montgomery	586	504	82	0	0.0	161	19,197	1.1
Washington East	386	284	102	20	5.2	73	24,173	19.1
TOTALS	**2,448**	**1,973**	**385**	**385**	**15.7**	**654**	**111,731**	**6.8**
GRAND TOTALS	**8,120**	**6,223**	**1,807**	**730**	**9.0**	**1,887**	**481,162**	**8.3**

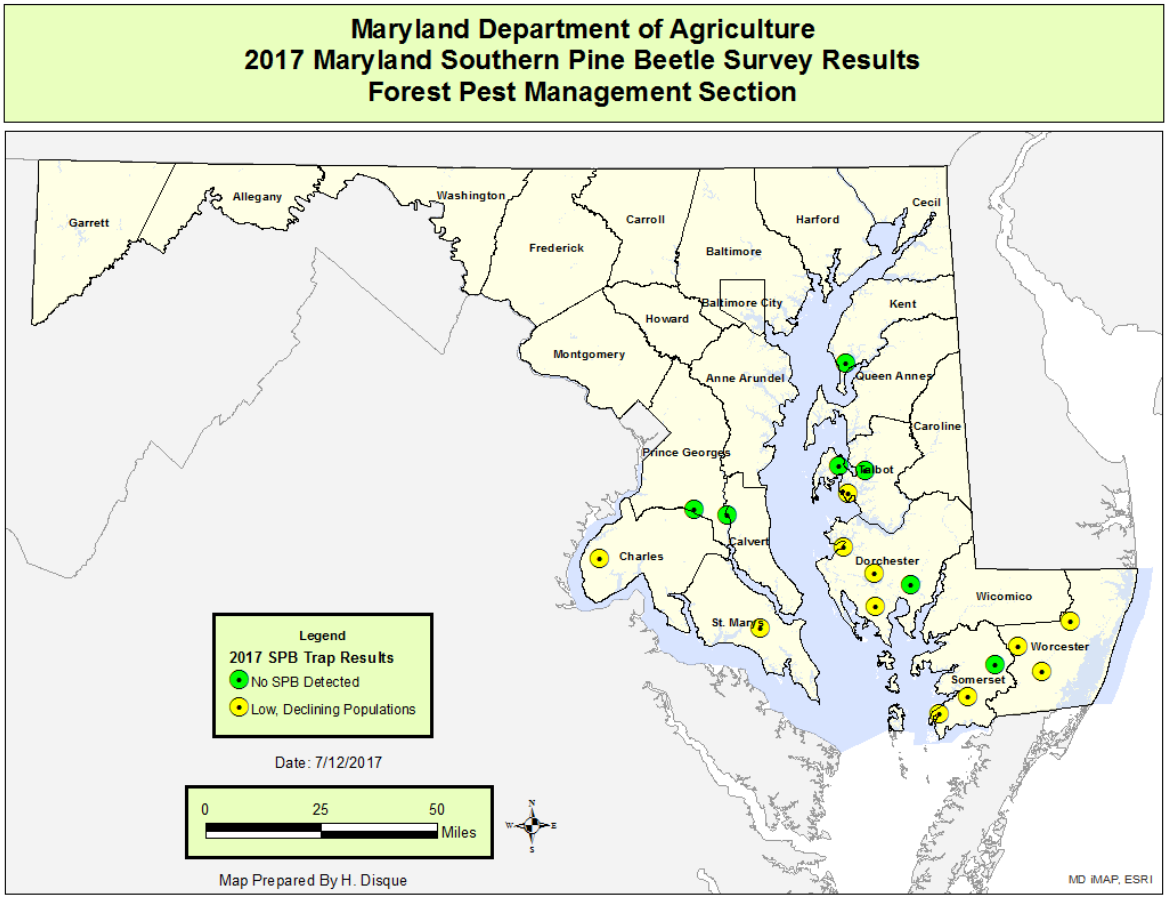
Southern Pine Beetle

The southern pine beetle (SPB) is one of the most destructive insect pests of pines. Maryland is at the northern edge of its range, and this pest is commonly found on the lower Eastern Shore and in southern Maryland. Since 1989, Maryland has participated in a multistate SPB survey throughout the Southern United States using pheromone-baited traps.

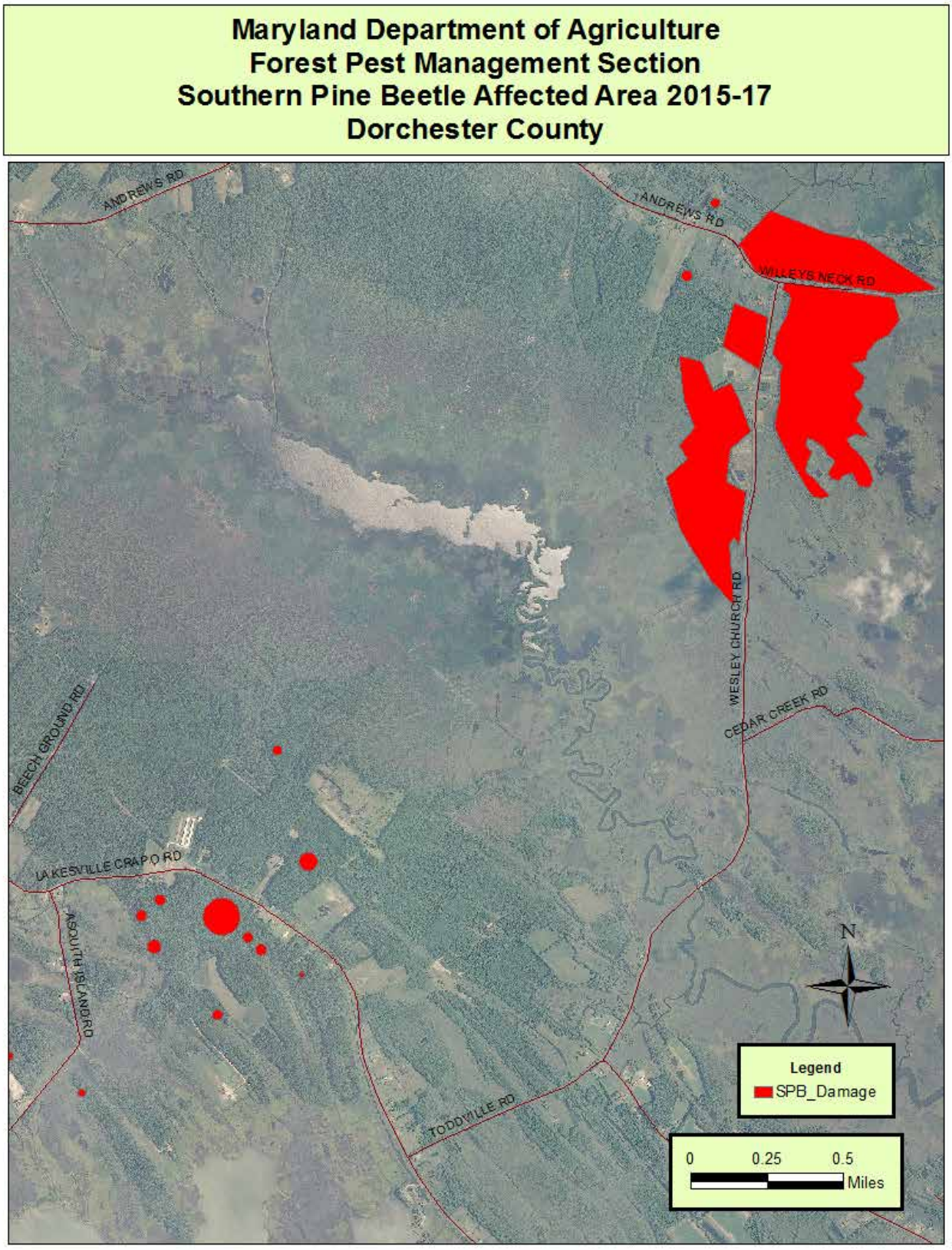
Traps were set up in nine counties across Maryland. Kent County was added into the survey in 2017. All traps collected little to no SPB, indicating that populations were to remain low in 2017. These traps were set up earlier in the year at the time of redbud bloom.

In addition to the traditional traps this spring, Forest Pest Management (FPM) personnel participated in an SPB experimental lure trial. Nine traps with three different lure combinations were set up in three counties with the most SPB activity. Data was forwarded to the Texas Forest Service and the U.S. Forest Service. Lure combinations included traditional lures, traditional lures and endo-brevicomin, and a Caribbean turpentine lure combination. All treatments collected SPB and the predatory clerid beetle. The endo-brevicomin treatment collected more SPB across all sites.

The Dorchester County area that had experienced an SPB outbreak in 2015–2016 saw no loss of trees in 2017. SPB trap counts nearby were very low compared to 2016. A combination of lower SPB populations across the region and the harvesting of three small tracts of pine at the infestation edge likely impacted the infestation.



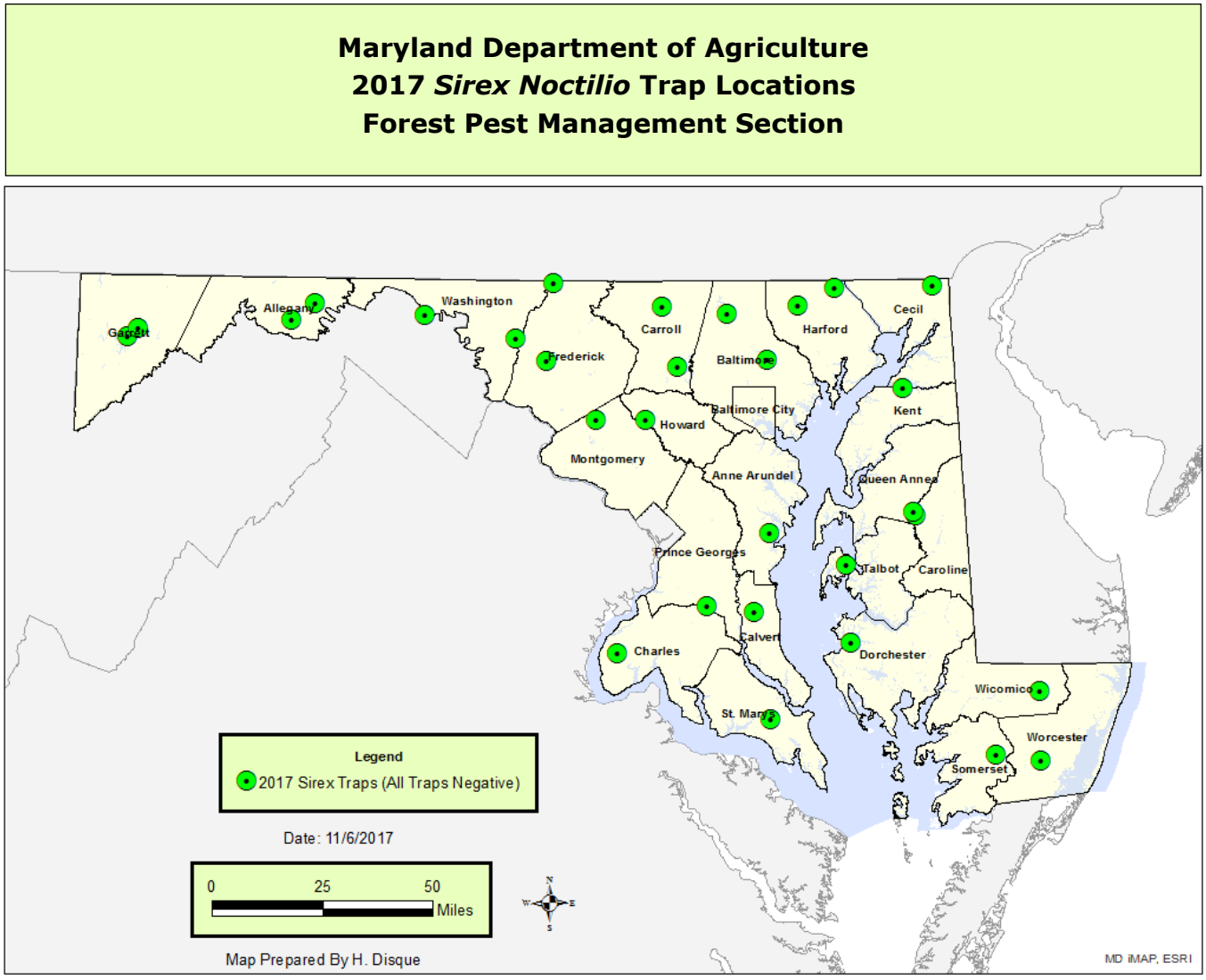
MDA Forest Pest Management Section 2017 southern pine beetle survey results.



MDA Forest Pest Management Section Dorchester County area affected by southern pine beetle from 2015–2017.

Sirex Noctilio (Woodwasp)

Sirex woodwasp has been the most common species of exotic woodwasp detected at United States ports-of-entry associated with solid wood packing materials. Recent detections of this woodwasp outside of port areas in the United States have raised concerns because this insect has the potential to cause significant mortality of pines. The Sirex woodwasp has not been detected in Maryland but is known to be in Pennsylvania. To detect this insect, MDA placed two traps per county in the northern tier counties and one trap for all other counties, for a total of 31 traps in pine woods. All traps were negative during CY 2017.

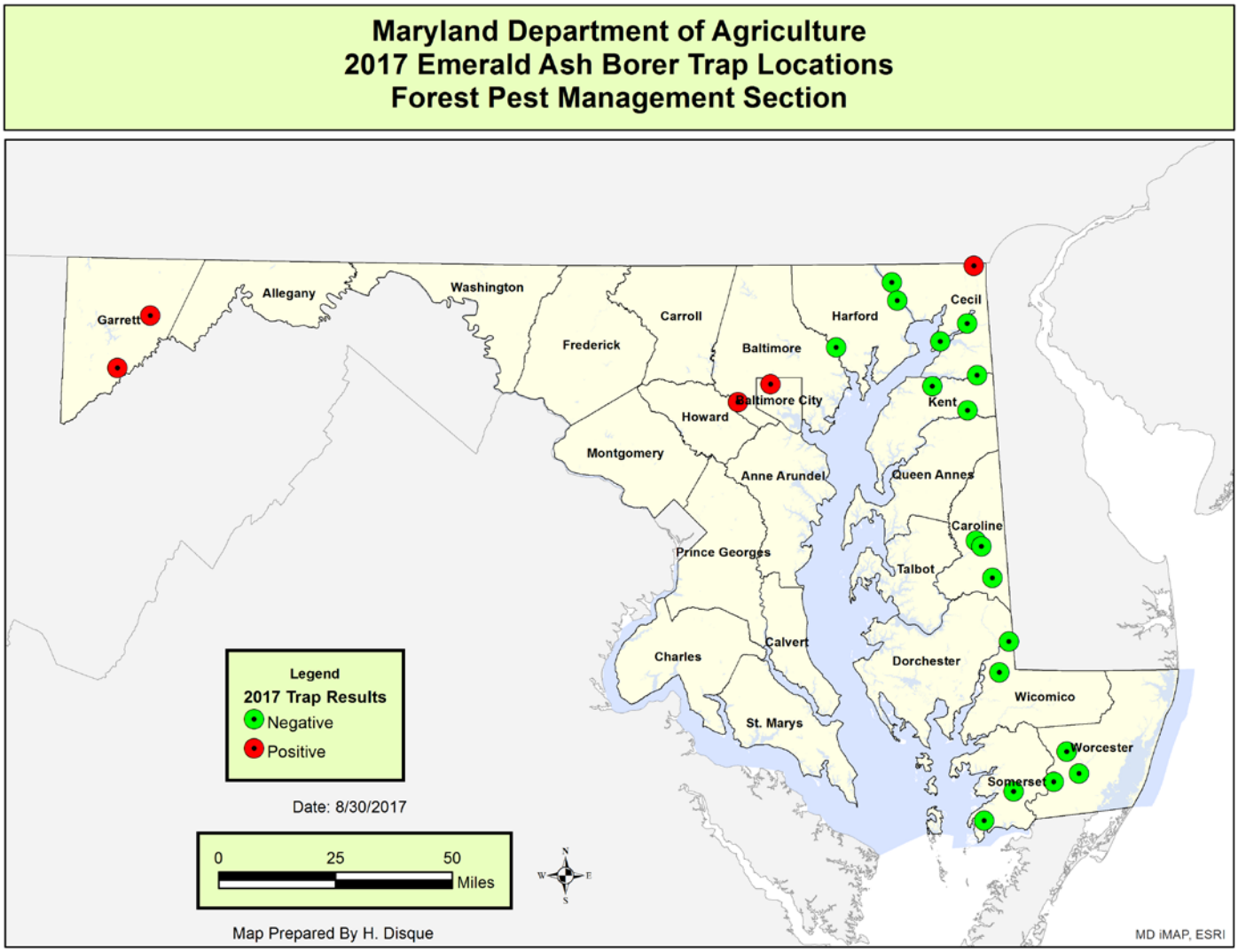


MDA Forest Pest Management Section 2017 Sirex noctilio *trap locations.*

Emerald Ash Borer

Personnel from the MDA FPM put up 24 green funnel traps. Five traps were positive for emerald ash borer (EAB) in 2017. Cecil and Kent Counties both recorded their first EAB detection. In March 2017 EAB was found in a tree in Kent County and was confirmed by a USDA identifier in April. This detection came from a land manager sick tree call.

During the 2017 field season, MDA FPM personnel released 82,888 parasitoids of the EAB. The parasitoids were released at six State park locations across Maryland including Garrett, Harford, Baltimore, and Caroline Counties as well as Baltimore City. In 2017, 28,107 *Oobius agrili* (a parasitoid that attacks EAB eggs) were released as pupae in 270 vials and adults in 11 cups. Two parasitoids that attack EAB larvae were also released: 48,363 *Tetrastichus planipennisi* were released in 656 bolts as pupae and 14 cups as adults,



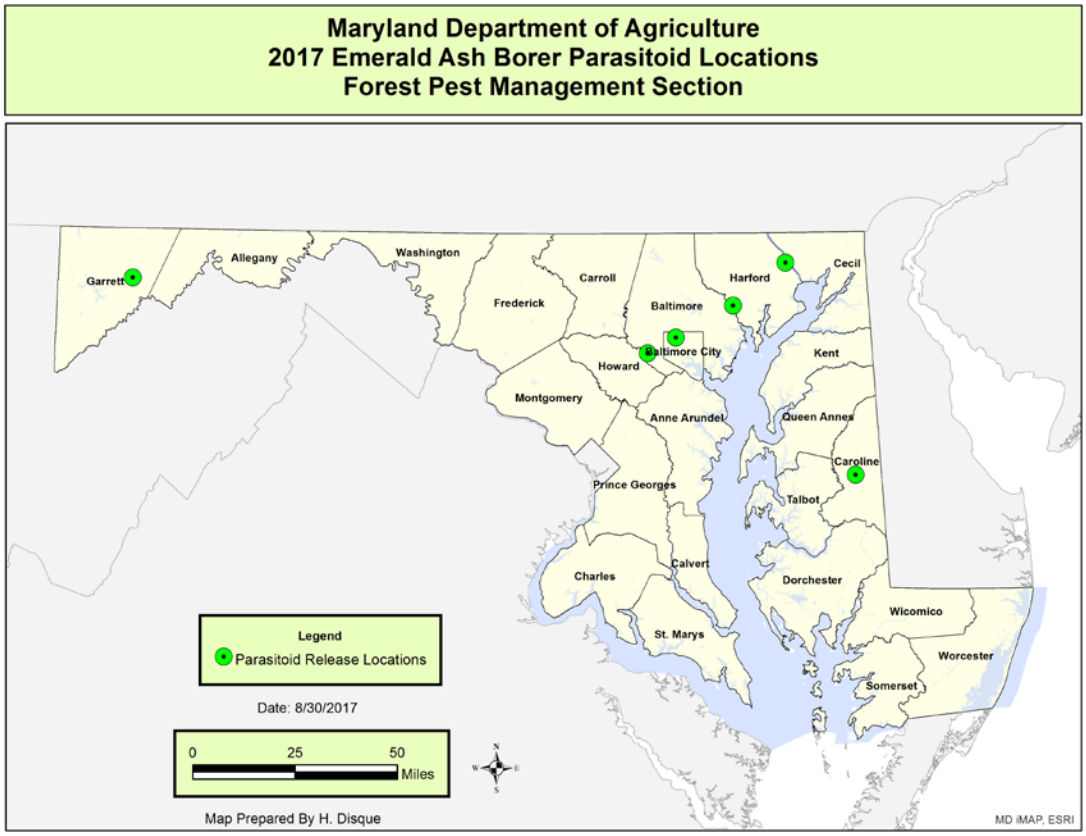
MDA Forest Pest Management Section 2017 emerald ash borer trap locations.

cups as adults, and 6,418 *Spathius agrili* were released as adults in 158 cups. This work is part of the Integrated Pest Management effort for the EAB landscape grant. These releases are being done in conjunction with parasitoid recovery research by the University of Maryland Entomology Department.

Maryland Department of Agriculture
Forest Pest Management
2017 Emerald Ash Borer Parasitoid Release Summary

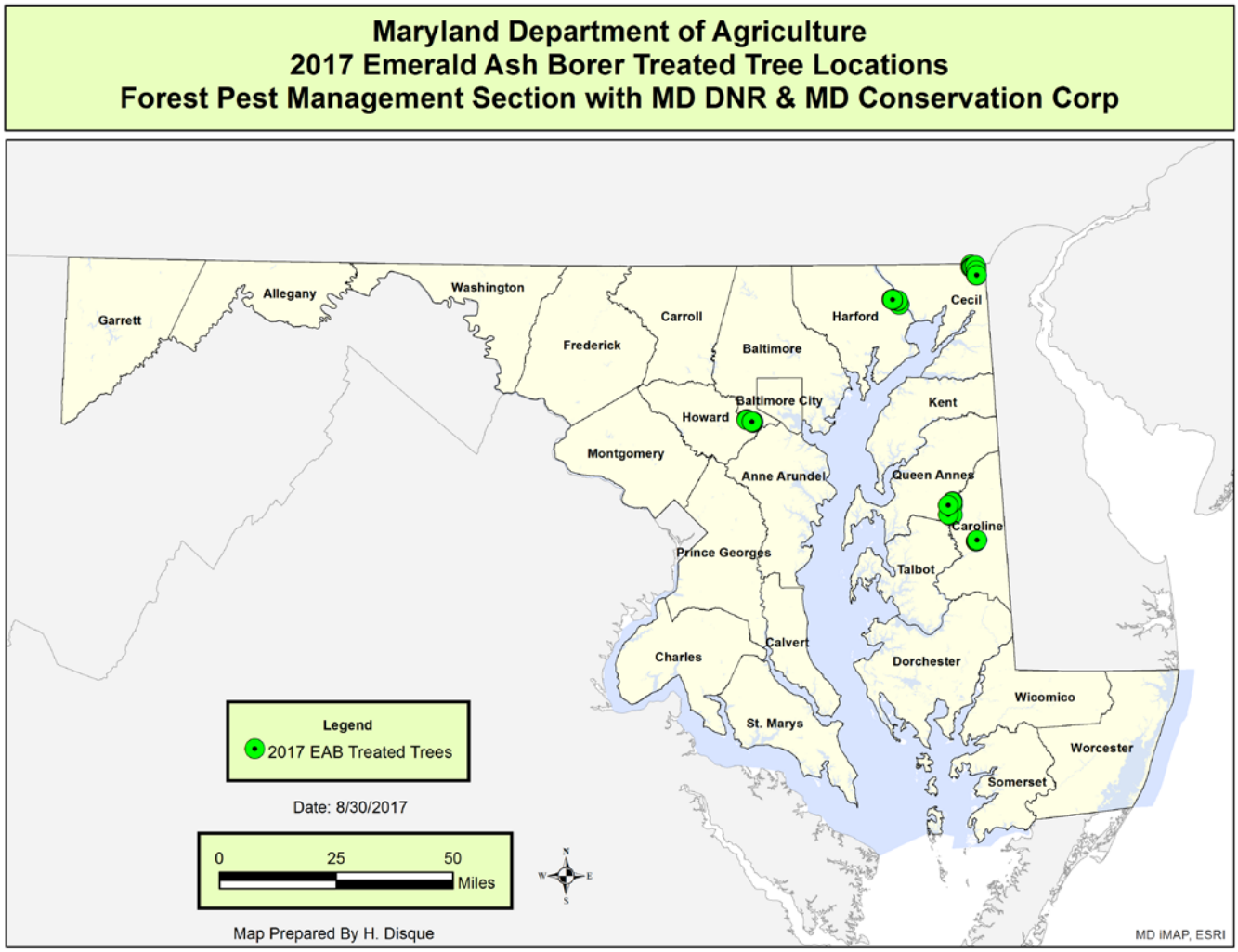
Site Name	Latitude	Longitude	Oa[1] # Vials/ Cups	Oa[1] Total	Tp[2] # Bolts	Tp[2] Total	Tp[2] Adults # Females	Tp[2] Adults # Males	Tp[2] Adults Total	Sa[3] # Cups	Sa[3] Total
Susquehanna State Park	39.61383	-76.15099	37	3,814	72	5,420	195	121	316	27	1,163
Patapsco Valley State Park	39.29593	-76.78358	37	3,700	86	6,734	0	0	0	21	905
Gunpowder Falls State Park	39.46263	-76.39238	38	3,748	77	5,692	195	84	279	30	1,121
Cylburn Arboretum	39.3513	-76.65368	37	3,700	87	6,804	0	0	0	20	883
Martinak State Park	38.86002	-75.84153	71	7,120	175	12,179	801	50	851	28	1,160
Big Run State Park	39.5449	-79.13853	61	6,025	159	9,832	200	56	256	32	1,186
Totals	**n/a**	**n/a**	**281**	**28,107**	**656**	**46,661**	**1,391**	**311**	**1,702**	**158**	**6,418**

[1]Oa = *Oobius agrili*
[2]Tp = *Tetrastichus planipennisi*
[3]Sa = *Spathius agrili*



MDA Forest Pest Management Section 2017 emerald ash borer parasitoid release locations.

In addition, FPM personnel supervised treatments of ash trees across Maryland. This work was done in State Parks in cooperation with the Maryland Department of Natural Resources and the Maryland Conservation Corps. In total 306 ash trees (representing 5,164 inches d.b.h.) were treated using 34,262 ml of TREE-äge (emamectin benzoate).



Location of trees treated for emerald ash borer in 2017.

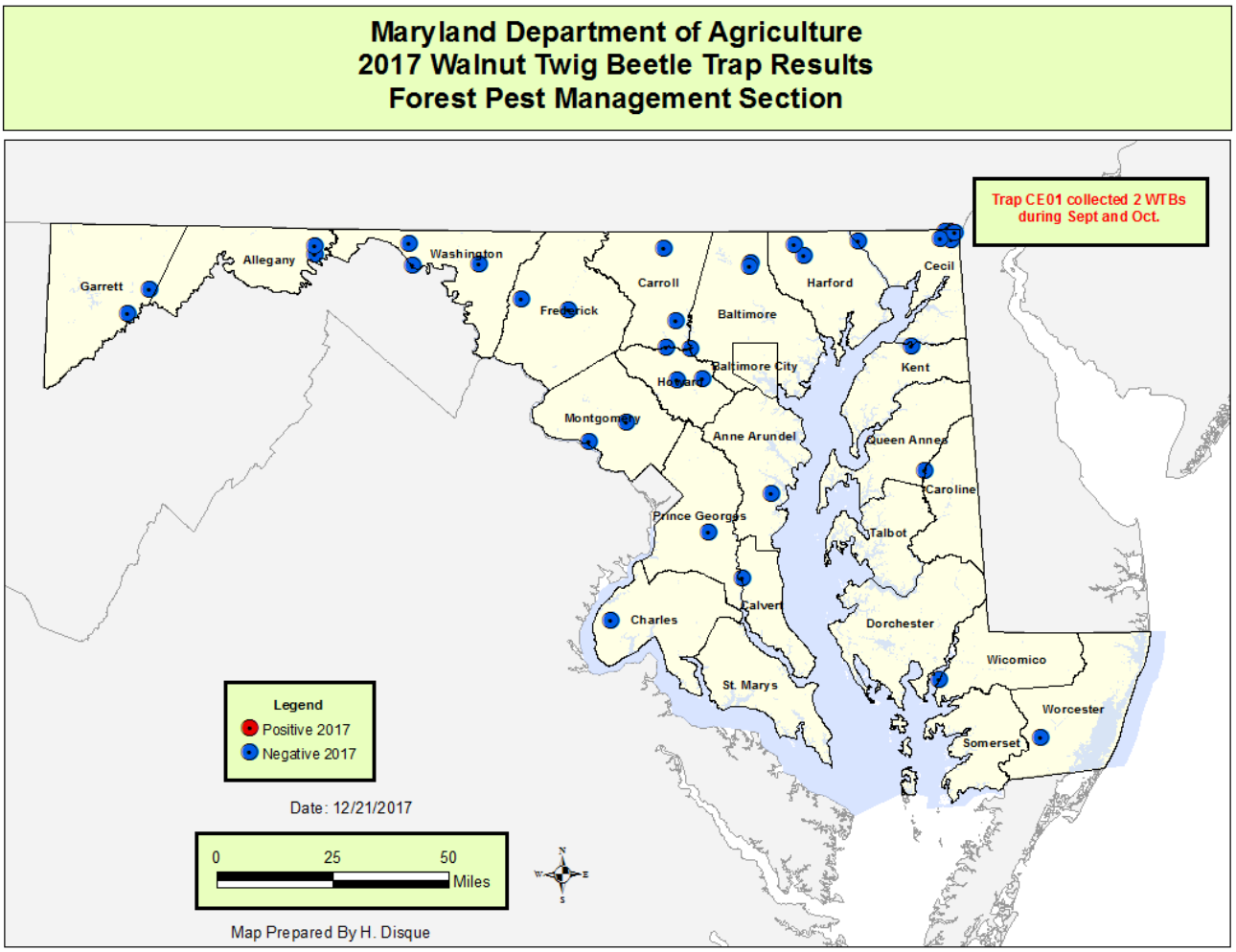
Thousand Cankers Disease of Black Walnut and Walnut Twig Beetle

Thousand cankers disease was first recognized in 2008 as a complex consisting of the walnut twig beetle (WTB), *Pityophthorus juglandis*, and the fungus *Geosmithia morbida*. It is blamed for widespread mortality of eastern black walnut planted in the Western United States. Following the first detection of this disease in the Eastern United States in Tennessee, Maryland began to survey for it in 2011. The walnut twig beetle was first detected in Maryland in 2013; by October 2014, thousand cankers disease was confirmed. A quarantine order has been in place since January 2015 to limit the spread of thousand cankers disease of black walnut from the northeastern corner of Cecil County.

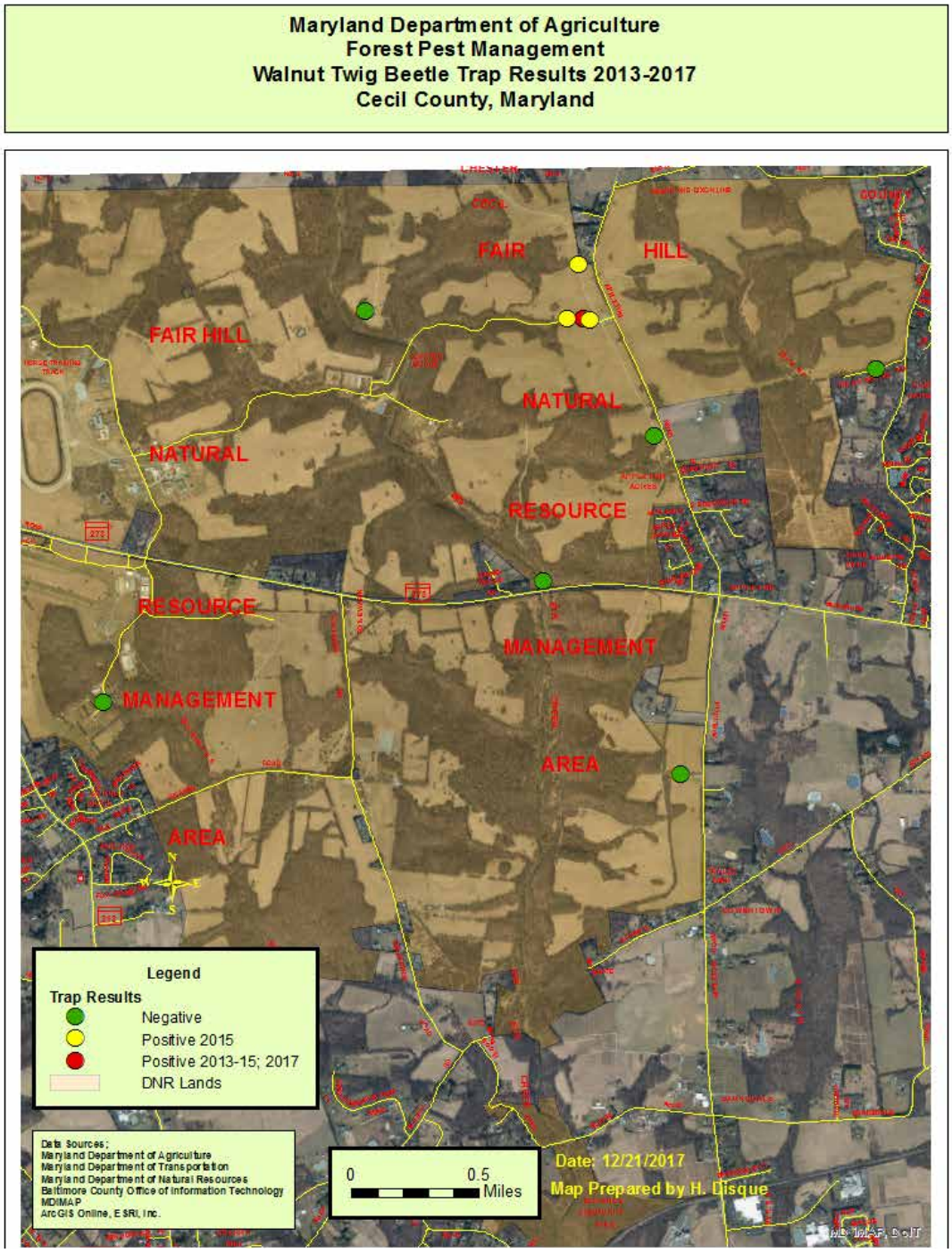
Thirty-nine Lindgren funnel traps baited with the walnut twig beetle lure were set across

18 counties in Maryland in 2017. Eight traps were set in Cecil County to try to delimit the outbreak near the positive site discovered in 2013, which was positive again in 2014 and 2015. Traps were checked every 2 weeks; field samples were collected, sorted, and labeled in the office, then sent to the Pennsylvania Department of Agriculture for identification.

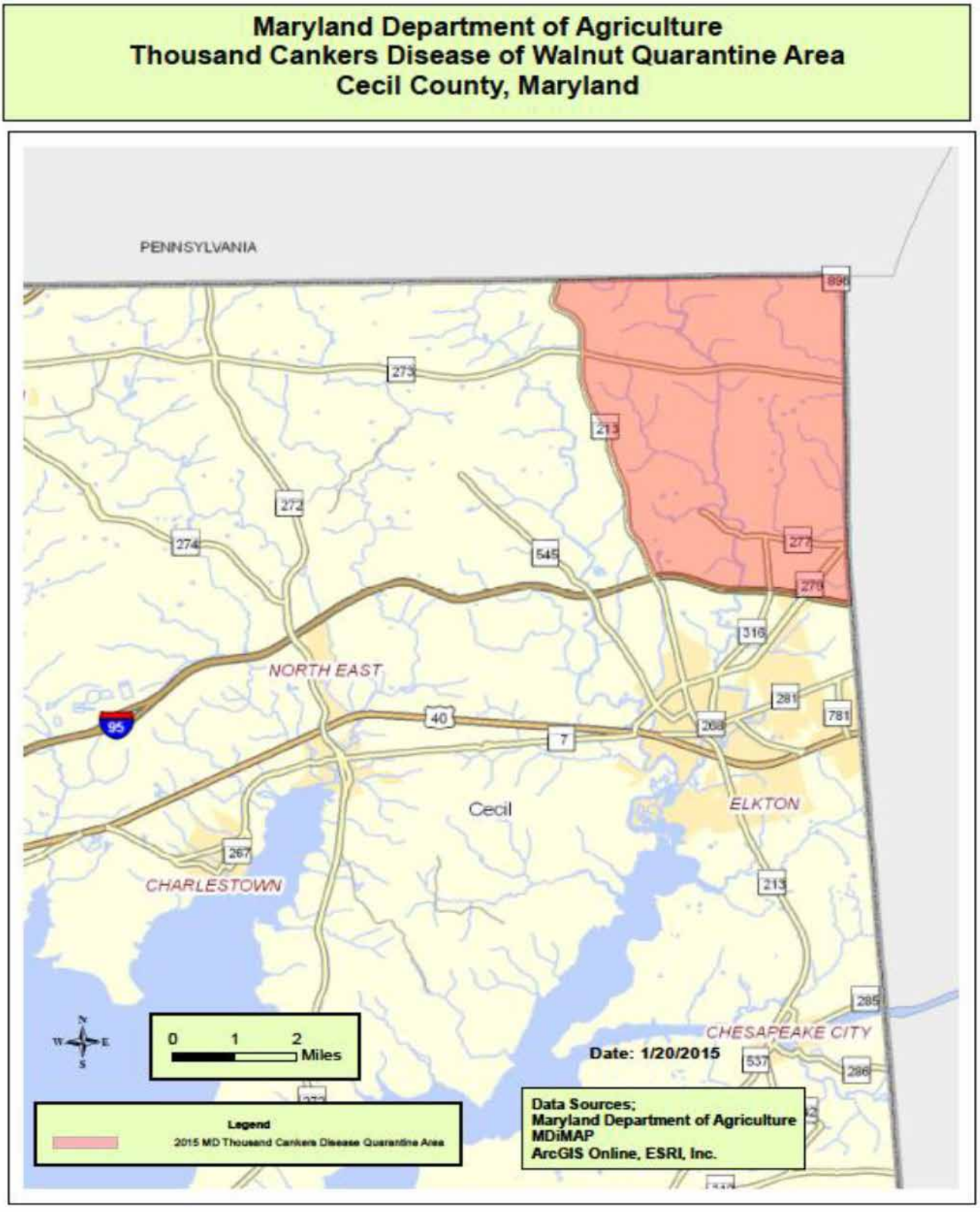
Trap #CE01 was positive for WTB in 2017. Two beetles were collected: one in August and the other in September. This trap was set in the previously positive site. No new positive sites were found in 2017. Trees at the original positive site continue to show no evidence of decline.



MDA Forest Pest Management Section 2017 walnut twig beetle trap results.



MDA Forest Pest Management Section walnut twig beetle trap results in Cecil County, Maryland, for 2013 to 2017.



MDA thousand cankers disease of black walnut quarantine area in Cecil County, Maryland.

Hemlock Woolly Adelgid

Hemlock woolly adelgid (HWA) remains the major threat to the health of eastern hemlock. Infested hemlocks occur in the metropolitan area between Baltimore and Washington and in natural stands from Cecil to Garrett Counties. In 2003-2004, a joint task force of the MDA Forest Pest Management Section and Maryland Department of Natural Resources experts addressed the multidisciplinary needs of the HWA infestation. The task force prioritized more than 50 hemlock stands and selected them as the sites for joint suppression efforts (chemical and/or biocontrol). Only publicly owned or public use sites would be part of this suppression project.

Currently, the chemical option involves treating hemlock trees with the insecticide imidacloprid by one of two methods: trunk injection or soil injection. The biocontrol option involves releasing HWA predators into the hemlock stands in an effort to reduce HWA populations.

A total of 9,287 hemlock trees (representing 102,274.5 inches d.b.h.) were treated in Maryland between July 1, 2016, and June 30, 2017. Of this total, 1,174 trees (representing 14,282.3 inches d.b.h.) were trunk (stem) injected, and 8,113 trees (representing 87,992.2 inches d.b.h.) were soil (includes CoreTect tablets) injected.

Maryland Department of Agriculture
Forest Pest Management
Fall 2016 – Spring 2017 Imidacloprid Treatments for
Hemlock Woolly Adelgid Control in Maryland

Hemlock Stand	County	Trunk Injection (# trees)	Trunk Injection (in. d.b.h.*)	Soil Injection (# trees)	Soil Injection (in. d.b.h.*)	Total (# trees)	Total (in. d.b.h.*)
Prettyboy Reservoir	Baltimore	41	585	325	2,866	366	3,451
Frederick Watershed	Frederick	143	2,261	154	795	297	3,056
Potomac Garrett SF	Garrett	0	0	185	2,797	185	2,797
Rocks State Park	Hartford	0	0	264	2,293	264	2,293
Gunpowder Falls State Park	Baltimore	0	0	365	4,487	365	4,487
Hagerstown Watershed	Washington	0	0	586	5,466	586	5,466
Green Ridge State Forest	Allegany	0	0	73	896	73	896
Big Run State Forest	Garrett	144	1,736	0	0	144	1,736
Wolf Swamp SRSF **	Garrett	552	6,681	3,715	40,315	4,267	46,996
Savage River State Forest	Garrett	286	2,910	1,719	18,488	2,005	21,398
Gambrill State Park	Frederick	7	91	5	46	12	137
Licking Creek	Washington	0	0	338	3,801	338	3,801
South Mountain State Park	Washington	1	20	0	0	1	20
Sidling Hill WMA	Allegany	0	0	200	2,481	200	2,481
Total	**n/a**	**1,174**	**14,284**	**7,929**	**84,731**	**9,103**	**99,015**

*d.b.h. = diameter of the tree trunk 4.5 feet above the ground

**Treatments done by Forest Pest Management and Maryland Conservation Corps (Department of Natural Resources)

Hemlock Woolly Adelgid Predator Releases

More than 47,000 predators have been released in Maryland since 1999. FPM's Forest Health Technician participated in field collections of *Laricobius nigrinus* in the Western United States and locally at Rocky Gap in Maryland, which resulted in the distribution of more than 4,000 beetles to Northeastern Area States. *Laricobius nigrinus* beetles were released at sites in Garrett, Frederick, and Harford Counties in 2017.

Maryland Department of Agriculture
Forest Pest Management
Maryland Hemlock Woolly Adelgid Predator Releases 2003–2017

Hemlock Stand	County	*Laricobius nigrinus*	*Laricobius osakensis*	*Scymnus coniferarum*	*Scymnus sinuanodulus*	*Sasajiscymnus tsugae*
Rocky Gap State Park	Allegany	3,476	0	105	0	5,000
Prettyboy Reservoir	Baltimore	2,672	0	0	0	0
Cunningham Falls State Park	Frederick	810	0	0	0	0
Frederick City Watershed	Frederick	2,381	0	0	945	0
Broad Creek Scout Camp	Harford	2,302	0	0	0	15,410
Rocks State Park	Harford	1,424	0	0	0	0
Hagerstown Watershed	Washington	853	0	0	0	0
Big Run (Savage River SF)	Garrett	1,685	0	0	0	0
Big Run State Park	Garrett	50	0	0	0	0
Dry Run (Savage River SF)	Garrett	150	0	0	0	0
Frostburg Watershed	Garrett	300	0	0	0	0
Laurel Run (Potomac SF)	Garrett	1,000	0	0	0	0
Lostland Run (Potomac SF)	Garrett	1,500	500	0	0	0
Poplar Lick (Savage River SF)	Garrett	2,289	1,510	0	0	0
Elk Lick (Savage River SF)	Garrett	1,491	500	0	0	0
Gunpowder Falls State Park	Baltimore	0	1,010	0	0	0
Total	**n/a**	**22,383**	**3,520**	**105**	**945**	**20,410**

Hemlock Woolly Adelgid Suppression Efficacy Surveys

Treatment efficacy surveys have been conducted annually since 2006. Treated trees averaged a 79% reduction in HWA populations when measured 1 year after treatment, and nontreated trees averaged a 24% increase in HWA populations when measured over the same time period. In 2016–2017, efficacy surveys were done at treatment sites in Garrett, Frederick, Washington, Allegany, Carroll, and Baltimore Counties.

Bacterial Leaf Scorch

Bacterial leaf scorch was prevalent all through the State this year. It was observed not only on ornamental trees but throughout Maryland in forested areas. This disease was more severe this year than last.

Exotic Asian Defoliator Survey

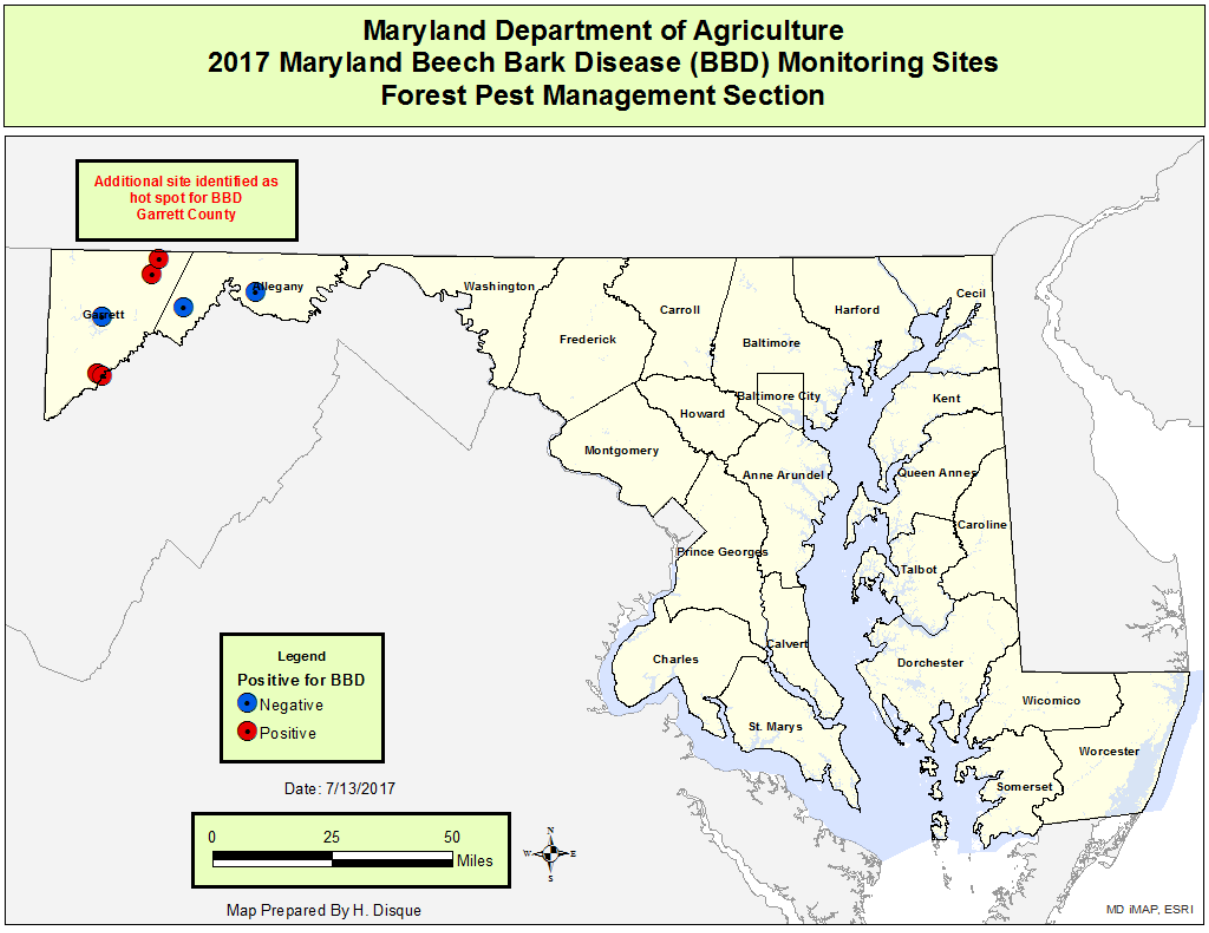
A comprehensive exotic Asian defoliator survey was proposed and funded through the Farm Bill for 2017. This survey increases the likelihood of an early detection of a harmful invader and that an appropriate eradication response can be mounted to protect

Maryland's forest industry. One of the high-risk areas targeted is the Chesapeake Bay since it is a major thoroughfare for ships calling on the Port of Baltimore. An increase in the size of ships and ship traffic coming to Baltimore has increased the risk of an accidental introduction of exotic Asian defoliators. Seven moth species were chosen for the survey based on their biological characteristics that enable them to become successful invaders, their habitat preference, and prior intelligence that suggests an increased risk of introduction.

FPM personnel deployed traps at 12 locations statewide to determine the presence or absence of Asian defoliator moths. At each location, five traps are set up to survey for the seven moth species. Traps are being run from June to September and checked every 2 weeks. Forests composed of oak, willow, sweetgum, poplar, beech, pine, and other host trees and shrubs are being surveyed. To date, only three traps have come up positive for gypsy moths. The European and Asian gypsy moths are difficult to morphologically separate, so the specimens were sent to the USDA OTIS lab for genetic testing and species determination.

Beech Bark Disease

Beech bark disease (BBD) has been found only in Garrett County. There are 154,473 acres of infested forest in Garrett County. Four permanent BBD monitoring sites were set up in 2013. A new hot spot for BBD was identified in March 2017. This area in northern Garrett County is approximately 20 acres. The BBD is very evident and trees are in decline.



MDA Forest Pest Management Section 2017 beech bark disease monitoring sites.

Saltwater Intrusion

In July 2017, a saltwater intrusion delineation flight was flown across the Lower Eastern Shore. This flight mirrored the flight taken in 2013 and 2016 to determine the areas affected by saltwater intrusion and to map changes.

A total of 13,096 acres of forest were found to be affected by saltwater intrusion. The majority of the affected acres were again in Dorchester County. Somerset, Worcester, and Wicomico Counties also saw an increase this year in the acres of forest affected by saltwater intrusion. Fifty percent of the affected forest was determined to be very severely affected by saltwater intrusion. Forty-eight percent of the affected forest was severely affected by saltwater intrusion, and 2% of the forest was moderately affected by saltwater intrusion.

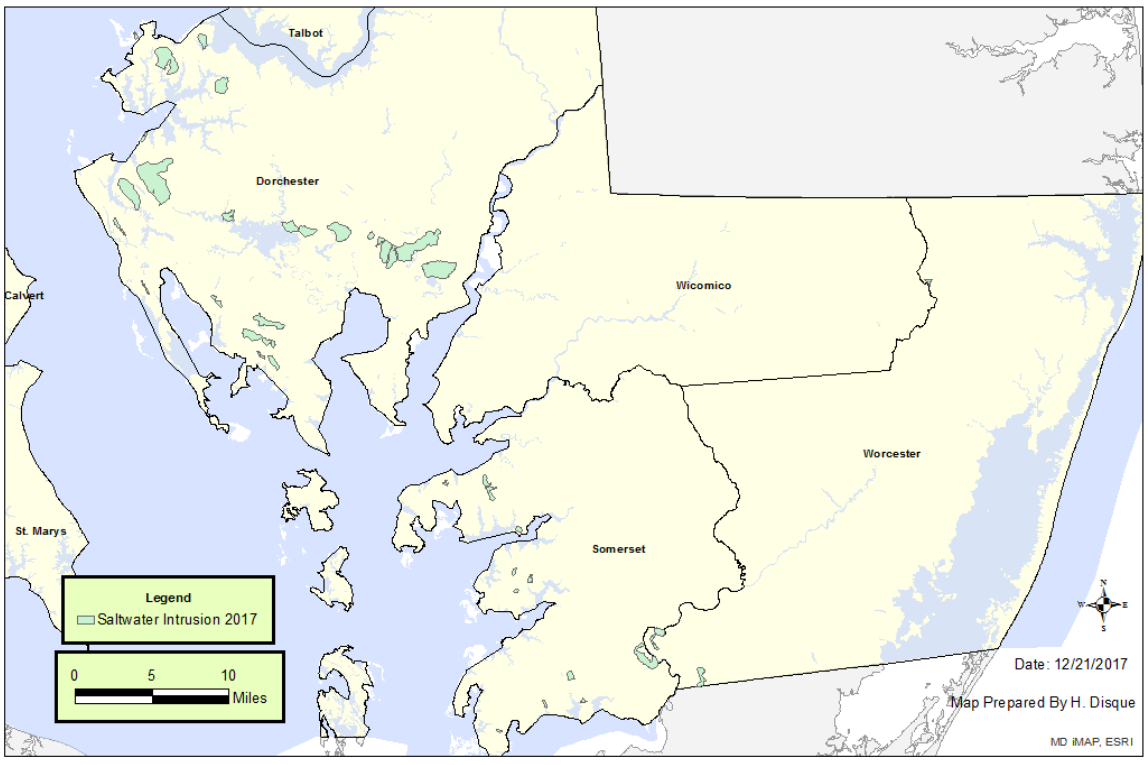
Maryland Department of Agriculture
Forest Pest Management
Saltwater Intrusion Flight Summary

Damage Agent	Acres Affected
Saltwater Intrusion	13,096
Variable Oakleaf Caterpillar	1,753
Unknown	493
TOTAL	**15,342**

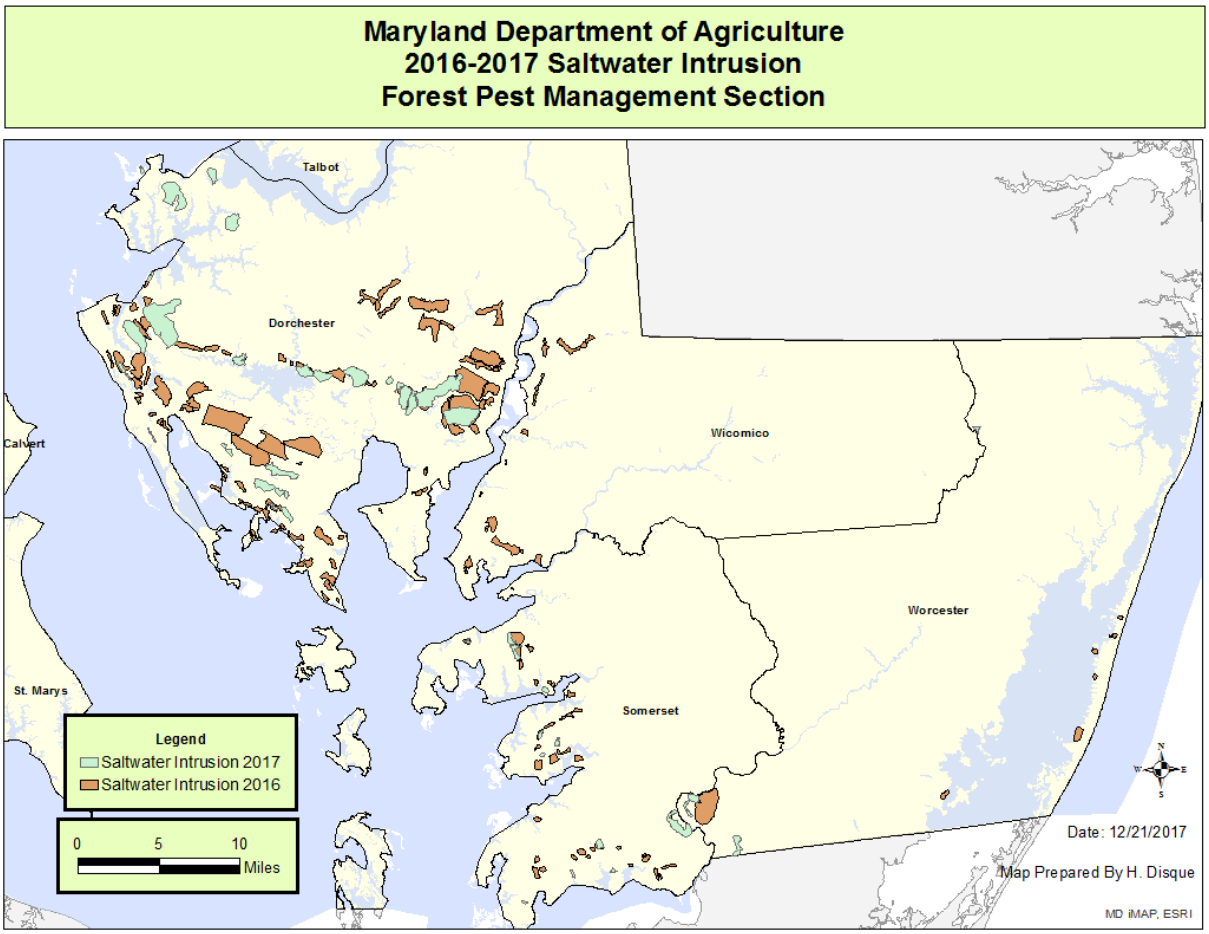
Maryland Department of Agriculture
Forest Pest Management
Saltwater Intrusion Flight Summary

Percentage of Forest Affected	Acres
Very light (1-3%)	0
Light (4-10%)	0
Moderate (11-29%)	273
Severe (30-50%)	6,233
Very Severe (>50%)	6,589
Total	**13,096**

Maryland Department of Agriculture
2017 Saltwater Intrusion Mapping Flight
Forest Pest Management Section



MDA Forest Pest Management Section 2017 saltwater intrusion mapping flight.



MDA Forest Pest Management Section saltwater intrusion for 2016 and 2017.

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Note: All graphics and maps courtesy of MDA.

Forest Health Programs

State forestry agencies work in partnership with the U.S. Forest Service to monitor forest conditions and trends in their State and respond to pest outbreaks to protect the forest resource.

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